

REMARKS

Claims 1 through 37 and 39 through 41 are currently pending in the application.

Claim 38 has been canceled.

Claims 1, 4, 18, 21, 29, and 32 have been amended.

Applicant respectfully requests reconsideration of the application as amended herein.

This amendment is in response to the Office Action of July 8, 2002.

Claims 4, 5, 21, 22, 32, 33 and 38 were objected to under 37 C.F.R. § 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Appropriate amendments have been made to claims 4, 21, and 32. Claims 5, 22, and 33 depend from amended claims 4, 21, and 32. The amendments place these claims in condition for allowance.

Claims 1 through 5, 16, 18 through 24, 27, 29 through 33, 37, 38 and 41 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ochiai et al. (United State Patent 5,643,831).

Claims 6 through 11, 17, 25, 26, 28 and 34 through 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (United States Patent 5,643,831).

Claims 12 through 15, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (United States Patent 5,643,831) in view of Bolstad (United States Patent 2,979,773).

35 U.S.C. § 102(b) Anticipation Rejections

Applicant submits that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1 through 5, 16, 18 through 24, 27, 29 through 33, 37, 38 and 41 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ochiai et al. (United States Patent 5,643,831).

Ochiai discloses a method for fabricating solder bumps. A solder ball forming member has cavities which are filled with solder paste, then heated to form solder balls due to surface tension. The solder balls are then transferred to a first member. The size of the outline of the cavity is larger than the size of the solder ball to be formed. Col. 3 line 65 through Col. 4 line 7.

Amended independent claims 1, 18, and 29 of the present application each recite a mold apparatus for forming at least one metal bump for placement on a secondary substrate. The mold apparatus has at least one cavity with substantially the same dimensions as the metal bump to be formed. Metal solder paste may be applied to the mold, then slightly melted to transfer the metal bumps to a carrier substrate. The metal bumps thus maintain substantially the same dimensions as the cavity of the mold apparatus when transferred.

Ochiai does not disclose a mold apparatus that includes a "cavity having substantially the same dimensions as the at least one metal bump" formed by the mold apparatus. Rather, Ochiai discloses a mold different from the claimed apparatus wherein the mold has a cavity having the same dimensions as the metal bump. The solder ball forming member disclosed in Ochiai has cavities with a depth smaller than the diameter of the solder ball to be formed and transferred to the first member.

Therefore, Ochiai does not disclose each and every element of amended claims 1, 18, or 29 to anticipate the claimed invention under 35 U.S.C. § 102. Accordingly, it is respectfully submitted that none of amended independent claims 1, 18, or 29 are anticipated by Ochiai.

Claims 2 through 5 and 16 are each allowable, among other reasons, as depending from claim 1, which should be allowed. Claims 19 through 24 and 27 are each allowable, among other reasons, as depending from claim 18, which should be allowed. Claims 30 through 33, 37, and 41 are each allowable, among other reasons, as depending from claim 29, which should be allowed.

35 U.S.C. § 103 Obviousness Rejections

Applicant further submits that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure.

Ochiai

Claims 6 through 11, 17, 25, 26, 28 and 34 through 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (United States Patent 5,643,831).

Claims 6 through 11 and 17 are each allowable, among other reasons, as depending from amended independent claim 1, which should be allowed. Claims 25, 26, and 28 are each allowable, among other reasons, as depending from amended claim 18, which should be allowed. Claims 34 through 36 are each allowable, among other reasons, as depending from amended claim 29, which should be allowed.

Ochiai et al. in view of Bolstad

Claims 12 through 15, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (United States Patent 5,643,831) in view of Bolstad (United States Patent 2,979,773).

Claims 12 through 15 are each allowable, among other reasons, as depending from amended independent claim 1, which should be allowed. Claims 39 and 40 are each allowable, among other reasons, as depending from amended claim 29, which should be allowed.

Applicant submits that claims 1 through 37 and 39 through 41 are clearly allowable over the cited prior art.

Applicant requests the allowance of claims 1 through 37 and 39 through 41 and the case passed for issue.

Respectfully submitted,



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Enclosure: Version with Markings to Show Changes Made

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

A marked-up version of each of the presently amended claims, highlighting the changes thereto, follows:

1. (Twice Amended) A mold apparatus for forming at least one metal bump for direct placement on bond pads on a secondary substrate, comprising:
a substrate having a surface;
at least one cavity formed in said surface of said substrate, said cavity having substantially the same dimensions as the at least one metal bump; and
a nonstick protective layer applied to said at least one cavity.

4. (Twice Amended) The mold apparatus according to claim 1, wherein said nonstick protective layer comprises means for preventing a [prevents] metal material from adhering to said at least one cavity.

18. (Twice Amended) A solder mold apparatus for forming at least one metal bump for direct placement on a corresponding bond pad on a secondary substrate, comprising:
a substrate having a surface;
at least one cavity formed in said surface of said substrate, said cavity having substantially the same dimensions as the at least one metal bump;
a nonstick protective layer applied to said at least one cavity; and
a metal paste applicator.

21. (Twice Amended) The solder mold apparatus according to claim 18, wherein said nonstick protective layer comprises means for preventing a [prevents] metal material from adhering to said at least one cavity.

29. (Twice Amended) A mold apparatus for forming at least one metal bump with a width and a length for direct placement on bond pads on a secondary substrate, comprising:
a substrate having a surface;
at least one cavity formed in said surface of said substrate, said at least one cavity having a selected width and a selected length in said surface, said selected width and said selected length being substantially the same as said width and length of the at least one metal bump; and
a nonstick protective layer applied to said at least one cavity.

32. (Twice Amended) The mold apparatus according to claim 29, wherein said nonstick protective layer comprises means for preventing a [prevents] metal material from adhering to said at least one cavity.